Trends in Children's Consumption of Beverages: 1987 to 1998

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Beverages contribute to the overall quality of children's dietary intake. This study examined trends in beverage consumption for children age 1 to 19 years for three 2-year periods between 1987 and 1998. Intakes were collected from a nationally representative sample of households. A 2-week diary by the National Family Opinion Research/Beverage Unit's Share of Intake Panel during 1987-88, 1992-93, and 1997-98 was used to collect these intakes. During these periods, the consumption of carbonated soft drinks decreased significantly for children age 1 to 5 years—83.5, 78.2, and 72.1 percent, respectively, whereas consumption of milk remained stable for all groups, and consumption of lowfat milk became more prevalent than consumption of whole milk. The quantity of milk consumed increased for children age 1 to 5 years (11.6 to 13.5 oz/day), while the quantity of carbonated soft drinks consumed decreased (5.2 to 3.7 oz/day). The quantity of fruit drinks increased for all age groups. This study is useful to those who are developing strategies to improve the overall quality of children's diets. Further research is needed to investigate the effect children's beverage consumption has on their health and to evaluate the effect of beverage consumption on total dietary intake.

Children consume fewer meals at the dining table and more meals and snacks away from home. Only 36 percent of respondents to a recent study on eating habits reported that they ate together as a family five or more nights a week (Anonymous, 2000). For teenagers, 5 percent of out-of-home eating occasions consisted of a trip to a convenience store—most often for a beverage purchased from a vending machine (Anonymous, 1999b). Throughout the day, children consume a variety of beverages, which often include milk, juice, fruit drinks, carbonated soft drinks, powdered soft drinks, and water.

To implement strategies to improve the health of children, the nutrition community needs to understand the effect of beverage consumption on nutrition, in terms of the frequency and quantity of each beverage consumed, as well as the relationship of beverages to food consumption and health. However, it is somewhat difficult to determine the contribution of each beverage to the overall diet, especially children's diets.

Efforts to promote milk consumption have increased, and their effects on health and nutrition have yet to be understood fully. Calcium intake is low for adolescent girls, a particular concern because calcium absorption is at its highest during adolescence (Amschler, 1999). When calcium intake is inadequate early in life, the risk of osteoporosis increases (National Institutes of Health [NIH], 1994). Some studies have reported that consumption of carbonated soft drinks has increased; this may have a significant effect on nutrition (Borrud, Enns, & Mickel, 1997).

Research suggests that caffeine, which is more frequently found in cola

beverages than in other soft drinks, may reduce calcium retention (Weaver, Proulx, & Heaney, 1999). Also, the phosphoric acid in carbonated beverages (cola and others) interferes with the metabolism of calcium (Calvo, 1994; Wyshak, 2000; Wyshak & Frisch, 1994). Other researchers, however, disagreed with these findings (The Pediatric Forum, 2001). Heaney and Rafferty (2001) concluded that the net effect of caffeine on calcium economy was negligible.

Finally, no conclusive evidence has indicated that carbonated soft drinks are the "cause" of low intakes of other beverages or that they are displacing other beverages in the diet, although some studies indicate a very suggestive relationship between higher quantities of carbonated soft drinks and lower quantities of milk consumption (Bowman, 1999; Harnack, Stang, & Story, 1999).

The debate over the consumption of fruit juice remains, having been argued to have effects on children's health that are both favorable (Doucette & Dwyer, 2000; Skinner & Carruth, 2001) and unfavorable (Dennison, Rockwell, & Baker, 1997; Tanasescu, Ferris, Himmelgreen, Rodriquez, & Perez-Escamilla, 2000). Regardless, 100-percent fruit juice is an excellent source of many essential vitamins and minerals and is consumed by a significant number of U.S. children (Ballew, Kuester, & Gillespie, 2000).

In recent years, fruit drinks—often made with only 5 to 10 percent fruit juice—have emerged as a growing component of the American diet. In 1997, sales of fruit drinks surpassed sales of 100-percent fruit juices (Sfiligoj, 1998). Fruit drinks, despite their higher sugar content, compared with fruit juices, provide about 17 percent of vitamin C for children age 2 to 5 and are the second greatest source of vitamin C for children of all ages (Subar, Krebs-Smith, Cook, & Kahle, 1998). Although fruit drinks could contribute to improved vitamin intakes, their effect on nutrition is not understood fully.

Beverages are a significant portion of the American diet, contributing to the intake of various nutrients as well as added sugars. The *Dietary Guidelines for Americans* recommend that Americans "Choose beverages and foods to moderate their intake of sugars" (U.S. Department of Agriculture [USDA] and Department of Health and Human Services [DHHS], 2000). However, a recent study found that among children age 2 to 17, 38 to 56 percent of the added sugars they consumed came from beverages (Guthrie & Morton, 2000). Because childhood obesity is rising, more information is needed to investigate the changes in children's diets over time. The purpose of this study was to investigate trends in children's beverage consumption (both prevalence and quantity) over a 10-year period.

Methods

Survey Design

Data were obtained from the National Family Opinion Research/Beverage Unit's Share of Intake Panel (SIP) (National Family Opinion World Group [NFO], 1999; National Soft Drink Association [NSDA], 1999), a syndicated marketing research program at the national level. Since 1980, SIP has used mail surveys, which are primarily purchased by industry members, to monitor beverage consumption. The survey instrument is a 2-week diary that collects all beverage intakes (excluding tap water) for all members of the selected household. Participants are told to exclude tap water, but to include bottled water. Tap water is difficult for consumers to quantify, even though its contribution to beverage consumption may be significant. In this study, milk intake reflects only beverages; milk consumed with cereal was not included, nor was milk in other forms of dairy products (e.g., cheese).

SIP samples 3,000 individuals quarterly, for an annual total of 12,000 individuals. Mailings to 4,498 households in each quarter are staggered weekly to ensure coverage across the whole year. The sampling is done at the household level and balanced at the individual level by weighting the data quarterly to be representative of the U.S. population (age within gender, household income and size, region, and market size).

In addition to demographic information, the SIP diary collects the following information for each beverage consumed: brand and flavor, beverage attributes (e.g., diet, regular, sugar-free), time of day and month when consumed, type and size of container in which it was purchased, class of trade where drink was purchased, type of container from which it was consumed, where it was consumed (home, away, etc.), temperature of beverage when consumed (hot, cold), and quantity (in ounces) consumed at one occasion.

Because a mail survey was used to collect the data, all initial instructions were given in writing. Households were instructed how to quantify beverages (ounces or cups) by providing them with two-dimensional food models. For the children who were unable to keep their own records, another family member did so.

Data Analysis

We analyzed data from children who were age 1 to 19 years in 1987-88 (n=4,143), 1992-93 (n=2,748), and 1997-98 (n=2,397). Beverages that made the greatest contribution to total

beverage intake were used in this investigation: milk (whole, lowfat, and skim/buttermilk), carbonated soft drinks (regular and diet), fruit juices, fruit drinks, powdered soft drinks (unsweetened, presweetened, sugar-sweetened, and sugar-free), and tea (hot, cold, herbal, and ready-to-drink). "Lowfat" milk consisted of any milk not specified as either whole milk or skim milk (i.e., 1% and 2% milks). The classification of fruit juice was based on the respondents' perceptions and knowledge about the variety of beverages. "Other" beverages consisted of coffee, breakfast drinks, beer, and other forms of alcohol. Fewer than 5 percent of the children were reported to have consumed these other beverages; thus, the contribution of these beverages to the total volume of beverage intake was minor and not included in this analysis.

Of the children who drank the beverages studied, the total quantities over each 2-week survey period were converted so that we could estimate mean daily consumption (in ounces/day) for each specific age/gender group. Chi-square tests for trends were performed to observe changes in prevalence of beverage consumption over the three survey periods; Bonferoni *t*-tests were performed to test for statistical significance in mean daily intake among survey periods.

Results

Prevalence

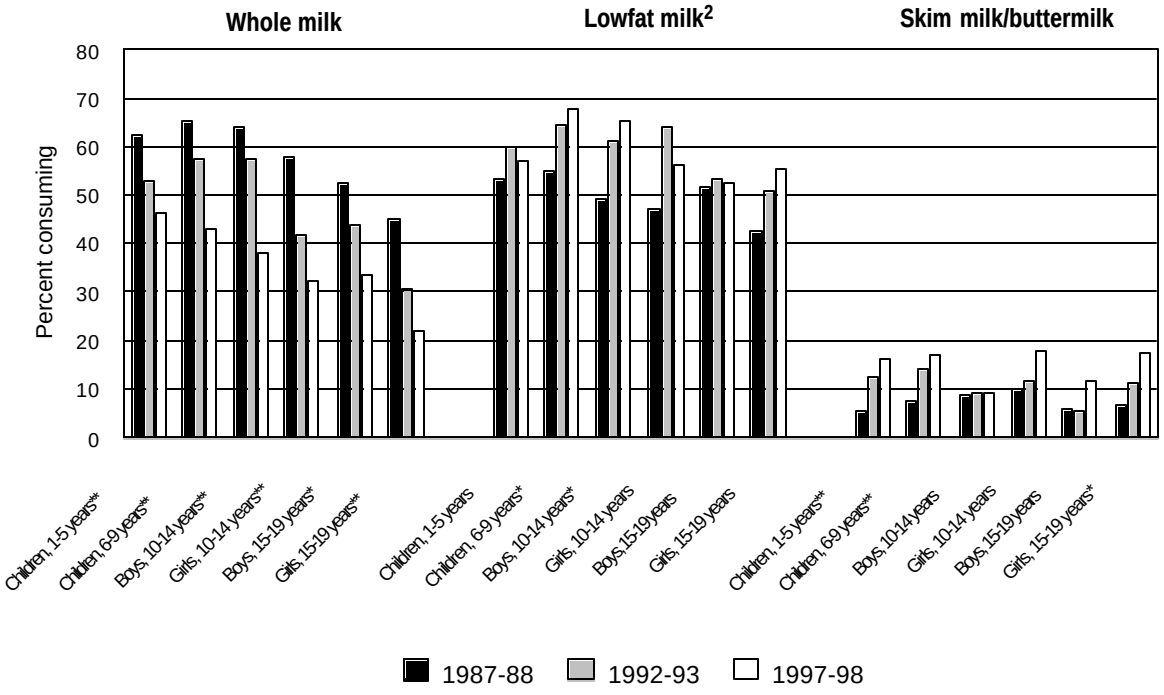
Milk, carbonated soft drinks, and juices, respectively, were the most commonly consumed beverages across age groups (table 1). Seventy-six to 95 percent of the children consumed milk; 72 to 97 percent, carbonated soft drinks; and 53 to 79 percent, juices. The percentage of children reporting milk consumption, however, remained statistically similar over the decade.

Table 1. Children drinking selected beverages, by selected years

Gender/age groups	1987-88 (n=4,143)	1992-93 (n=2,748)	1997-98 (n=2,397)
		Percent	
		Milk[1]	
Children, 1-5 years	93.8	95.1	90.7
Children, 6-9 years	95.2	94.8	94.5
Boys, 10-14 years	92.2	92.2	87.0
Girls, 10-14 years	91.7	88.9	83.4
Boys, 15-19 years	87.2	81.7	80.9
Girls, 15-19 years	75.9	75.5	78.1
		Carbonated soft drinks	
Children, 1-5 years*	83.5	78.2	72.1
Children, 6-9 years	92.4	91.1	86.7
Boys, 10-14 years	92.6	93.6	91.4
Girls, 10-14 years	94.5	91.7	90.3
Boys, 15-19 years	94.6	95.9	95.2
Girls, 15-19 years**	96.8	94.8	81.9
		Juices	
Children, 1-5 years	77.3	76.7	78.5
Children, 6-9 years	74.1	68.4	68.9
Boys, 10-14 years	66.6	61.4	54.2
Girls, 10-14 years	69.5	67.4	63.0
Boys, 15-19 years	65.8	66.9	56.8
Girls, 15-19 years	63.5	63.9	53.4
		Fruit drinks	
Children, 1-5 years	53.3	55.4	61.0
Children, 6-9 years	55.6	58.9	62.1
Boys, 10-14 years	47.6	49.5	60.1
Girls, 10-14 years	49.3	54.3	56.6
Boys, 15-19 years	44.4	37.8	46.1
Girls, 15-19 years	35.9	47.4	50.2
		Powdered soft drinks	
Children, 1-5 years	54.4	50.7	45.2
Children, 6-9 years*	59.1	52.8	44.4
Boys, 10-14 years	48.5	43.8	40.8
Girls, 10-14 years	52.7	40.7	43.0
Boys, 15-19 years	35.7	35.9	26.8
Girls, 15-19 years	27.5	30.2	23.1
		Tea	
Children, 1-5 years**	32.6	21.2	17.3
Children, 6-9 years*	37.3	23.4	20.3
Boys, 10-14 years	42.0	35.6	37.1
Girls, 10-14 years*	42.3	40.4	26.4
Boys, 15-19 years	41.0	39.3	41.5
Girls, 15-19 years	50.9	36.0	31.8

[1]Contains milk beverages only. Milk consumed with cereal or milk in other forms (e.g., cheese) is not included.
* $p<0.05$, ** $p<0.001$ = significant difference in percentages across selected years.
Note: Beverage consumption was gauged if a child consumed at least one serving of the beverage over a 2-week period.

Figure 1. Children consuming whole, lowfat, and skim milk/buttermilk,[1] by selected years



[1]Contains milk beverages only. Milk consumed with cereal or milk in other forms (e.g., cheese) is not included.
[2]1% and 2% milks.
*p<0.05, **p<0.001 = significant differences in percentages across the selected years.

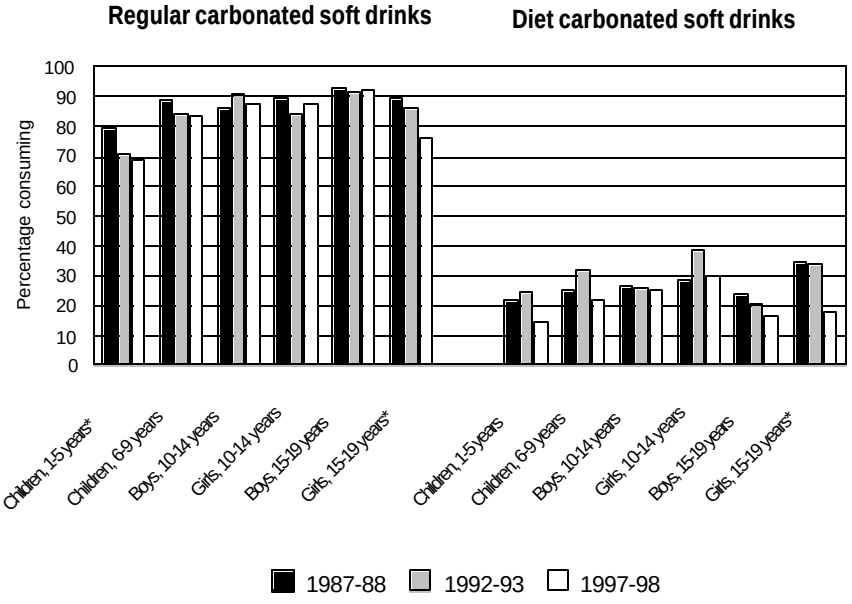
The prevalence of milk consumption was lowest for girls age 15 to 19, compared with the other age groups. A little more than three-fourths of 15- to 19-year-old girls reported any milk consumption during the three 2-week reporting periods (76 percent in 1987-88, 76 percent in 1992-93, and 78 percent in 1997-98).

From 1987-88 to 1997-98, while a significant decline occurred in the percentage of children in all age groups who drank whole milk, a rise occurred in the percentage consuming lowfat and skim/buttermilk (fig. 1). By 1992-93, the percentage of children drinking lowfat milk exceeded the percentages of children drinking whole milk in all age groups. By 1997-98, 52 to 68 percent of the children in the various age/gender groups drank lowfat milk; whereas, 22 to 47 percent of the children consumed whole milk. The percentage of children drinking skim/buttermilk increased over the decade, particularly among younger children and 15- to 19-year-old girls. About 20 percent of girls age 10 to 19 years consumed skim/buttermilk in 1997-98.

The percentage of children drinking carbonated soft drinks did not change for most of the children age 6 to 9, girls age 10 to 14, or boys age 10 to 14 and 15 to 19 (table 1). There was, however, a significant decline in the percentage of children age 1 to 5 and girls age 15 to 19 who consumed carbonated soft drinks. During 1987-88, 84 percent of 1- to 5-year-olds consumed carbonated soft drinks; by 1997-98, 72 percent consumed this type of beverage. During 1987-89, 97 percent of girls age 15 to 19 consumed carbonated soft drinks, compared with 82 percent by 1997-98, a drop of 15 percentage points.

Over the survey period, the percentage of children who drank either regular or diet carbonated soft drinks remained stable, except for 1- to 5- and 15- to 19-year-old girls (fig. 2). The percentage of the youngest children (age 1 to 5 years) who consumed regular carbonated soft drinks decreased significantly: dropping from 79 to 69 percent. The percentage of the older girls (15 to 19 years) who drank regular or diet carbonated soft drinks also decreased significantly: from 90 to 77 percent in 1987-88 (regular) and 35 to 18 percent, in 1997-98 (diet).

Figure 2. Children consuming carbonated soft drinks, by selected years



*p<0.05 = significant difference in percentages across the selected years.

. . . we found no significant decline in the prevalence of children's milk consumption over the past decade, nor did we find an increase in the prevalence of carbonated soft drink consumption.

Over the survey periods, the percentage of children reporting juice consumption decreased slightly (table 1). However, the percentage of children among all age groups consuming fruit drinks increased over the 10-year period—although none of the differences were statistically significant. The number of children consuming powdered soft drinks decreased significantly among younger children (6 to 9 years), dropping from 59 to 44 percent. The number of children consuming tea also decreased significantly across the survey period for three age groups—children age 1 to 5 (33 to 17 percent), children age 6 to 9 (37 to 20 percent), and girls age 10 to 14 (42 to 26 percent).

Quantity

Boys consumed more milk than did girls in the same age group, and young children (1 to 9 years) drank more milk than any other beverages across all three periods. Mean daily milk intake increased significantly for children age 1 to 5: from 11.6 to 13.5 oz between 1987-88 and 1997-98 (table 2).

Children age 1 to 5 years decreased significantly their mean daily intake of carbonated soft drinks: from 5.2 to 3.7 oz/day between 1987-88 and 1997-98. The amount consumed by the other age/gender groups did not change significantly. Younger children (1 to 9 years) drank more milk (12 to 14 oz/day) than carbonated soft drinks (4 to 8 oz/day), but older children (10 to 19 years) consumed more carbonated soft drinks (12 to 23 oz/day) than milk (9 to 15 oz/day).

For children age 1 to 5 years, the quantity of fruit juice consumed increased significantly, from 5.0 to 7.0 oz/day during the 10-year period. For boys age 10 to 14 years, however, the quantity consumed decreased significantly from 4.5 to 3.3 oz/day. The average amount of fruit juice

remained stable for the other age/gender groups, with no group consuming more than 7.0 oz/day, on average.

The mean daily intake of fruit drinks for all age/gender groups increased across the decade. The quantities consumed were similar for all age groups and were slightly less than the mean quantities of fruit juice consumed. The quantity of tea consumed was negligible (despite its prevalence among older children) and was therefore not included in calculating estimates of mean daily consumption.

While the mean intake of fruit drinks increased over the decade, the average amount of noncarbonated soft drinks made from a powdered mix declined significantly. This decrease was most apparent for 15- to 19-year-old boys (from 4.6 to 2.1 oz/day).

Table 2. Children's mean daily intake[1] of selected beverages,[2] by selected years

	1987-88 (n=4,143)	1992-93 (n=2,748)	1997-98 (n=2,397)
		(Ounces/day)	
		Milk[3]	
Children, 1-5 years	11.6[a]	12.5[b]	13.5[b]
Children, 6-9 years	12.2[a]	13.0[b]	12.1[ab]
Boys, 10-14 years	13.6	13.7	12.5
Girls, 10-14 years	11.9	11.6	11.2
Boys, 15-19 years	14.7	12.7	11.7
Girls, 15-19 years	9.7	8.9	10.7
		Carbonated soft drinks	
Children, 1-5 years	5.2[a]	4.4[b]	3.7[c]
Children, 6-9 years	7.4	7.8	7.7
Boys, 10-14 years	13.6	15.6	14.6
Girls, 10-14 years	12.3	12.1	12.5
Boys, 15-19 years	22.0	21.4	22.9
Girls, 15-19 years	19.8	17.3	16.1
		Juices	
Children, 1-5 years	5.0[a]	6.3[b]	7.0[b]
Children, 6-9 years	4.0	4.0	4.0
Boys, 10-14 years	4.5[a]	3.5[b]	3.3[b]
Girls, 10-14 years	3.7	3.5	3.3
Boys, 15-19 years	4.3	4.4	4.3
Girls, 15-19 years	3.7	4.0	3.3
		Fruit drinks	
Children, 1-5 years	2.1[a]	2.8[b]	2.9[b]
Children, 6-9 years	2.2[a]	2.8[b]	2.9[b]
Boys, 10-14 years	3.1[a]	2.4[b]	3.7[a]
Girls, 10-14 years	2.3[a]	2.5[a]	3.6[b]
Boys, 15-19 years	2.9[ab]	2.4[a]	3.8[b]
Girls, 15-19 years	1.7[a]	3.5[b]	3.1[b]
		Powdered soft drinks	
Children, 1-5 years	4.0[a]	3.5[b]	3.5[b]
Children, 6-9 years	4.4[a]	4.8[a]	3.3[b]
Boys, 10-14 years	4.8[a]	3.4[b]	3.4[ab]
Girls, 10-14 years	4.1[a]	2.9[b]	3.4[ab]
Boys, 15-19 years	4.6[a]	4.1[a]	2.1[b]
Girls, 15-19 years	1.6[a]	2.3[b]	1.7[ab]

[1]Mean daily intakes are among those children who reported consumption.
[2]Significance is noted only when quantities are significantly different between at least two of the three periods for an age/gender group. Groups that share the same letter, however, are not significantly different at $p<0.05$.
[3]Contains milk beverages only. Milk consumed with cereal or milk in other forms (e.g., cheese) is not included.

Discussion

Prevalence

In light of the conclusion made by Harnack and colleagues (1999) that carbonated beverages have displaced milk consumption, we found no significant decline in the prevalence of children's milk consumption over the past decade, nor did we find an increase in the prevalence of carbonated soft drink consumption. An equally important trend is that children tended to shift from drinking whole milk to lower fat varieties over the decade, with lowfat milk being the favorite type of milk to drink by 1997-98.

Carbonated beverages continue to be a popular drink for children and adolescents. In 1997-98 carbonated soft drink intake was reported by 72 percent of even the youngest children (age 1 to

5 years), and it was considerably more prevalent among preteens and adolescents during the 2-week reporting periods in this study. These results are somewhat higher than those previously reported in the Continuing Survey of Food Intakes by Individuals (CSFII) (Federation of American Societies for Experimental Biology [FASEB], 1995; USDA, 1997). In the CSFII 1994-96, 37 percent of 3- to 5-year-olds, 48 and 44 percent of 6- to 11-year-old boys and girls, respectively, and 69 and 62 percent of 12- to 19-year-old boys and girls consumed carbonated soft drinks over a 2-day reference period. It is possible that differences in study design between SIP and the CSFII may have influenced the results. (CSFII used 2 days of dietary recalls to indicate prevalence, compared with 2 weeks used by SIP.) The data in this study show no increase in the prevalence of carbonated soft drinks during the reporting periods and show that the percentage of children age 1 to 5 and girls age 15 to 19 who reported drinking soft drinks actually decreased over time.

Quantity

The mean daily intake of milk by adolescent girls has remained relatively stable—although well below recommended quantities. In 1997-98 the average daily milk intake by girls age 10 to 14 and 15 to 19 years accounts for about 30 percent of the Dietary Reference Intake (DRI) for calcium (Baker et al., 2000; National Academy of Sciences [NAS], 1999). Ballew, Kuester, and Gillespie (2000) reported a concern for girls with a strong positive correlation between milk consumption and adequate intakes of vitamins A and B_{12}, folate, calcium, and magnesium. On the other hand, the amount of milk consumed by children 1 to 5 years old increased significantly and represents nearly 85 percent of the minimum recommended amount (2 to 3 8-oz servings of milk or its equivalent) from the Food Guide Pyramid dairy group with fluid milk alone (not including milk on cereal or in other forms, such as cheeses), indicating that the increase in mean daily intake is an encouraging change.

Among those children who reported consuming carbonated soft drinks, the mean daily intake did not change for most age and gender groups. Other studies observed significant increases in the quantity of carbonated soft drinks consumed (FASEB, 1995; USDA, 1997; Troiano, Briefel, Carroll, & Bialostosky, 2000). Harnack, Stang, and Story (1999) found a strong association between increased consumption of soft drinks and decreased consumption of milk and juice. They also reported that children who drank 9 or more ounces of carbonated soft drinks per day consumed significantly more energy than those who drank less than 9 oz. Intake of carbonated beverages, especially colas, was implicated as a risk factor for bone fracture in some studies (Goulding et al., 1998; Petridou, Karpathios, Dessypris, Simou, & Trichopoulos, 1997), although other research does not suggest such a link (Heaney & Rafferty, 2001).

The trends we observed in teenage girls' consumption of milk may be a concern regarding the development and maintenance of healthy bones. The importance of milk/dairy consumption should be emphasized to encourage adequate calcium intakes. Girls continued to consume nearly twice the amount of carbonated soft drinks, compared with milk; however, with the quantity of carbonated soft drink intake stable, and a decreased prevalence, no data in our study support the theory that carbonated soft drinks are displacing milk in children's diets.

Some have suggested that carbonated soft drinks displace more healthful

. . . children tended to shift from drinking whole milk to lower fat varieties over the decade, with lowfat milk being the favorite type of milk to drink by 1997-98.

beverages (Tanasescu, Ferris, Himmelgreen, Rodriquez, & Perez-Escamilla, 2000; Cavadini, Siega-Riz, & Popkin, 2000). Despite the lack of data showing an increase in the quantity of carbonated soft drinks consumed over the decade, the average daily intake of fruit juice remained fairly stable across most age groups, increased significantly by 2 oz/day among children age 1 to 5 years, and decreased significantly by 1 oz/day for boys age 10 to 14 years. Based on Food Guide Pyramid recommendations (USDA & DHHS, 1995), these data indicate that fruit juice accounted for over half of the recommended minimum number of servings per day (i.e., 2 6-oz servings of juice).

The quantity of fruit drinks consumed increased significantly over the decade. Fruit drinks have been heavily marketed to children and packaged for handy snacking (Russo, 1998). Although they generally have higher added sugar content than do fruit juices, many have been fortified with essential vitamins and minerals. When one manufacturer added calcium to fruit juice and fruit drinks in 1998, the sales response was so strong that other companies expanded calcium fortification of their product lines (Anonymous, 1999a). These beverages may make increasingly important contributions to children's diets, and an increase in their consumption may be beneficial if fortified fruit drinks with reduced amounts of added sugars are selected. Despite the benefits of fruit drinks, the trend toward increased consumption and prevalence may be a concern if consumption of other beverages is decreased as a result.

Strengths/Limitations

While our data provide an overview of changes in children's consumption patterns over the past decade, strengths as well as limitations of this study should be considered. A major strength of our data is that 2 weeks of information on consumed beverages were collected in a journal instead of on a recall basis. Respondents only recorded their beverage intake and not foods, as is required for a full food record, so the respondents' burden may have been reduced. Another strength is that the methods of data collection for this study have not changed in the past two decades, making comparisons of survey years straightforward. In some other surveys, collection methods have changed for each survey period, complicating the results and interpretation.

Although the samples were collected in the same manner throughout the study period—with specific attention given to obtaining a nationally representative sample—some sample response bias that is inherent to all surveys may have occurred over time (Bingham & Day, 1997). No oral instructions or three-dimensional food models were given to assist the respondents in quantifying and classifying the beverages; thus, any incongruence between the respondents' knowledge and factual definitions remained.

Implications

In this study, it was not possible to determine what the trend in total beverage intake is, because tap water was not included in the data collection, and it was not the study's purpose. It is simply not viable to say that one beverage is displacing another, since it could be merely increasing in addition to other fluids (e.g., tap water). The role that each beverage type plays in overall fluid consumption needs to be addressed in future research endeavors. Theoretically, the method for data collection is better in a randomly sampled population; however, the results from other panel samples yielded results similar to those in the randomly sampled CSFII population. Although more research is needed to examine specific populations at risk, children (and their parents if the children are too young to decide themselves) have been somewhat successful in making more healthful food selections (e.g., skim milk vs. whole milk). This verification of successful changes in dietary behaviors encourages future nutrition education efforts to include beverage selections as a part of dietary habits that promote healthful lifestyles.

Children's intake of calcium—estimated by the average amount of milk consumed—still falls below the recommended calcium intakes for all age groups. This study demonstrated some discrepancy between recommendations for children's dietary intake and actual intake of certain beverages. Significant changes in children's diets over the 10-year period include an increase in the amounts of milk and juice consumed by younger children, a decrease in the quantity of carbonated soft drinks consumed by 1- to 5-year-old children and 15- to 19-year-old girls, as well as an increase in the quantity of fruit drinks consumed by children of all ages. Hence, it is imperative to assess the contribution that beverages make to micro- and macronutrient intakes.

The trends in beverage consumption are only one area of overall dietary intake that we explored. The effects that beverages have on nutrition and healthful dietary patterns need to be investigated further. Changes in beverage consumption may be an indicator of overall changes in diet, but this has yet to be determined. Little is known about the lifestyles and habits related to beverage consumption, which could play an important role within trends. The trends in children's beverage consumption in the past 10 to 15 years provide insight into potential

educational programs that may help improve children's dietary habits and health. Once detailed information is obtained regarding precise populations at risk, educational strategies can be implemented to encourage and facilitate change.

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